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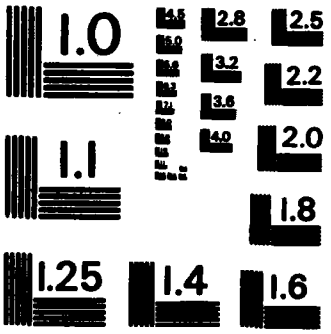

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ACCEPTANCE TEST PLAN
FOR BROADBAND MICROWAVE AMPLIFIER PANEL

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This report describes the acceptance tests to be performed on the broadband microwave amplifier panel prior to shipment to the Naval Research Laboratory.

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BROADBAND MICROWAVE AMPLIFIER PANEL TEST PLAN

1.0 INTRODUCTION

Acceptance tests for the broadband 10 KW panel developed under the microwave amplifier module program are designed to show that the delivered unit meets performance requirements in the areas of bandwidth, power output, pulse droop and tolerance to load impedance variations. When coupled with the special reliability tests described in document DSC-13509, these tests will also verify the thermal data used as an input to the reliability model for the amplifier. Since this is a research and development program with a high degree of flexibility in performance parameters, data will be taken for a great variety of pulsewidth, duty, and cooling conditons. The data from these other test conditions will be included in the final report, and made available at the time of the acceptance tests.

2.0 TEST PROCEDURES

The acceptance test procedures described herein for each testing category define the tests to be performed, parameters, ranges, special test equipment, and interface requirements.

3.0 ACCEPTANCE TESTS

These tests are designed to verify the following performance features:

1. Power output versus frequency
2. Pulse droop versus frequency
3. Tolerance to load impedance variations
4. Spectral response versus frequency
5. Amplifier temperature performance.
6. BITE circuit operation

3.1 Test Set Up

The microwave amplifier panel is connected to the test circuit as shown in Figure 1. The power supply(s) is set to 40 Volts, and the signal generator is set to the CW position. The pulse generator is adjusted to provide a 400 microsecond pulse at 125 PPS (5 percent duty). The water flow rate into the panel is set to 1.0 GPM.

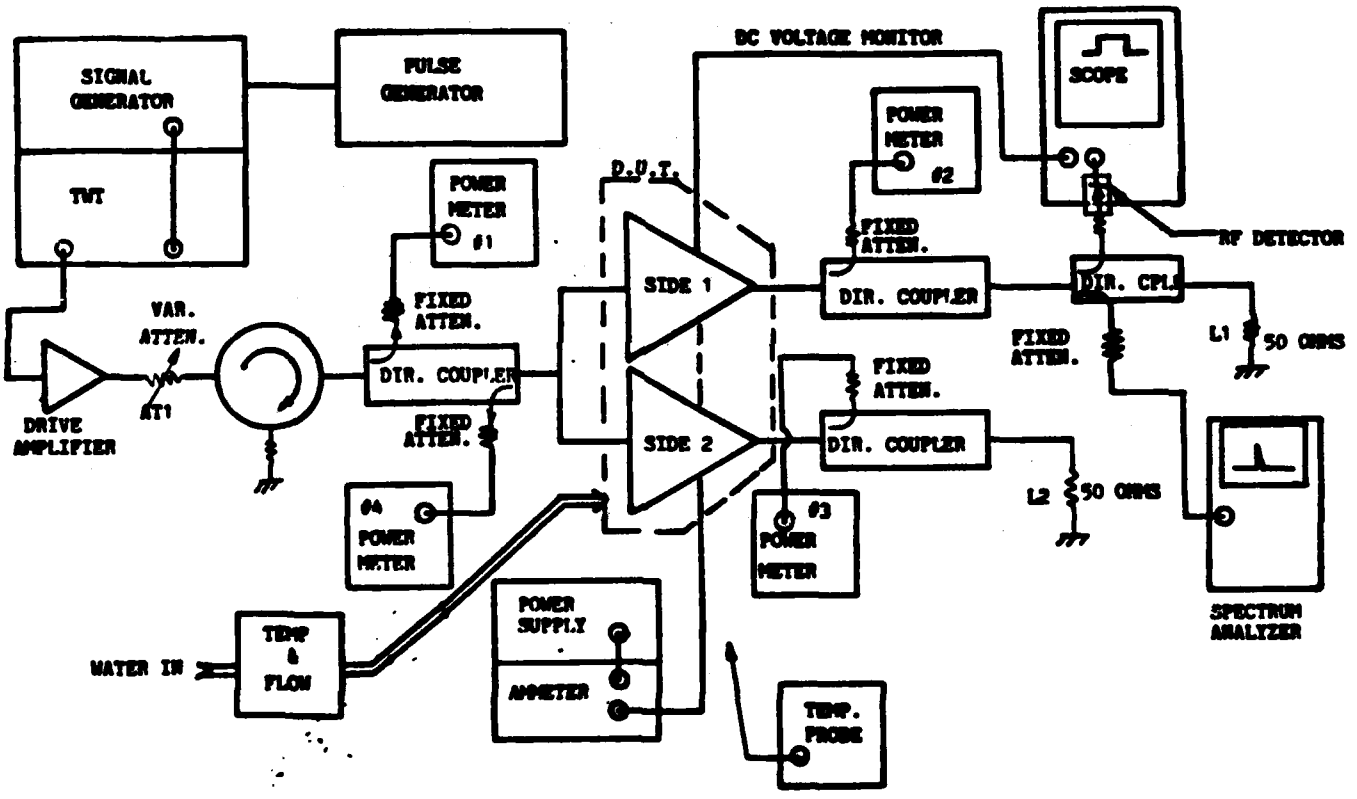

Figure 1. Acceptance Test Set Block Diagram

3.2 Test Equipment

1. Signal Generator, HP Model 8663
2. TWT Amplifier, Alfred Model 5010
3. Pulse Generator, Interstate Model P23
4. Power Meters (4), HP Model 435A
5. Spectrum Analyzer, HP Model 141T
6. Directional Coupler, 20 dB, HP Model 778D
7. Directional Coupler, 30 dB (2), Narda 3002-30
8. Variable Attenuator, 0-20 dB, Microlab AJ-310N
9. Fixed Attenuators, 15 dB (3), 20 dB (2)
10. Load, 50 Ohm (2), 500 W avg., Bird Electric 8201
11. Oscilloscope, Tektronix Model 2235
12. Circulator, P&H Labs Model L26339
13. Detector, RF, HP Model 423A
14. Driver Amplifier, Westinghouse breadboard unit
15. Temperature Probe, Omega Model 199

3.3 Test Procedure

1. Set the frequency of the signal generator to F_L, and adjust the variable attenuator AT1 to provide 600 Watts (peak) of power to the device under test. Measure the peak power output from each side of the device under test by means of power meters #2 and #3, using the calibration data for the couplers and fixed attenuators. Operate the spectrum analyzer to measure spurious and harmonic outputs, and use the temperature probe to indicate the hottest transistor flanges, and other points of interest on the panel. Disconnect loads L1 and L2 to demonstrate that the amplifier will survive load VSWR's of infinity. Repeat this test at 11 more frequency points across the band ending at F_H.

2. Calibrate the pulse presentation on the oscilloscope for 0.2 dB per division by adjusting the power supply voltage to vary the panel's output power while noting variations on PWR MTR #2 and on the oscilloscope. Observe the output pulse droop on the calibrated oscilloscope at both ends and at the center of the frequency band. The oscilloscope presentation should be recalibrated at each frequency.

3. Demonstrate the operation of the BITE circuit for the modules on the panel by disconnecting both the RF and DC inputs to one of the modules. The test point on the front panel for that particular module should indicate that it is not functioning properly.

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